

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 Claim 1 (original): A position information
2 transmission method for transmitting and receiving road
3 shape information and event information, the method
4 comprising the steps of:
5 intermittently selecting nodes in a target road
6 section on a digital map;
7 transmitting road shape information, wherein the road
8 shape information includes coordinate data of a selected
9 nodes and designates a target road section;
10 executing a map matching based on the road shape
11 information including coordinate information of the
12 selected nodes;
13 obtaining a road between the selected nodes by using
14 a route search; and
15 identifying the target road section on the digital
16 map;
17 wherein said steps of selecting nodes and transmitting
18 road shape information are executed at a transmitting side,
19 and
20 wherein said steps of executing a map matching,
21 obtaining a road, and identifying the target road section

22 are executed at a receiving side.

1 Claim 2 (original): The method according to claim 1,
2 wherein the road shape information transmitted from
3 the transmitting side includes supplementary information
4 indicating attributes of the selected nodes, and
5 wherein the receiving side references the
6 supplementary information in the step of executing a map
7 matching in order to determine the positions of the nodes.

1 Claim 3 (original): The method according to claim 2,
2 wherein the supplementary information indicating the
3 attributes of the nodes includes at least one of a node
4 type, a node name, a number of connecting links, angles
5 between connecting links, and an intercept azimuth at the
6 selected node.

1 Claim 4 (original): The method according to claim 2,
2 wherein the supplementary information indicating the
3 attributes of the nodes includes an intercept azimuth at
4 the selected node and at least one of a node type, a node
5 name, a number of connecting links, and angles between
6 connecting links.

1 Claim 5 (original): The method according to claim 1,
2 wherein the road shape information transmitted from

3 the transmitting side includes supplementary information
4 indicating attributes of links included between the
5 selected nodes, and

6 wherein the receiving device references the
7 supplementary information during using the route search in
8 the step of obtaining the road between the nodes.

1 Claim 6 (original): The method according to claim 5,
2 wherein the supplementary information indicating the
3 attributes of the links includes at least one of a road
4 type, a road number, and a link type.

1 Claim 7 (original): The method according to claim 1,
2 wherein the transmitting side selects a plurality of
3 nodes arranged around the selected node in the step of
4 intermittently selecting nodes in the target road section
5 and transmits the road shape information including the
6 coordinate data of each selected node.

1 Claim 8 (original): The method according to claim 1,
2 further comprising the steps of:

3 evaluating an accuracy of the matching at the
4 receiving side based on a distance from the node to a
5 closest point on an adjacent road and a difference between
6 the intercept azimuths at the node and at the closest point
7 on the adjacent road;

8 selecting a plurality of nodes arranged around the
9 selected node in the step of the intermittently selecting
10 nodes in the target road section; and

11 transmitting the road shape information including the
12 coordinate data of each selected node,

13 wherein the steps of evaluating an accuracy of the
14 matching, selecting a plurality of nodes, and transmitting
15 the road shape information are executed at the transmitting
16 side.

1 Claim 9 (original): The method according to claim 1,
2 further comprising the steps of:

3 comparing a setting date of the digital map data of
4 the road in the target road section with a regulated date;
5 and

6 transmitting the road shape information including data
7 representing the road shape in the target road section, in
8 case of that the setting date is later than the regulated
9 date;

10 wherein the steps of the comparing a setting date with
11 a regulated date and transmitting the road shape
12 information are executed at the transmitting side.

1 Claim 10 (currently amended): The method according to
2 claim 1,

3 wherein the road shape information transmitted from

4 the transmitting side includes a setting date that the
5 digital map data of the road in the target road section was
6 set, and

7 wherein the step of identifying the target road
8 section is skipped in case of that the setting date is
9 ~~latter~~later than a creation date of a digital map data
10 which the receiving side owns.

1 Claim 11 (original): The method according to claim 1,
2 wherein the road shape information transmitted from
3 the transmitting side includes distance data between the
4 intermittently selected nodes, and

5 the method further comprising the step of:

6 comparing the distance of the road connecting the
7 nodes obtained by way of the route search and the distance
8 between the nodes in the road shape information; and

9 discriminating propriety of the route search;

10 wherein the steps of the comparing the distances and
11 discriminating the propriety are executed at the receiving
12 side.

1 Claim 12 (original): The method according to claim 1,
2 further comprising the steps of:

3 evaluating an accuracy of the matching of nodes in the
4 target road section; and

5 determining a length of the target road section or

6 number of the nodes in the road shape information based on
7 the result of the step of evaluating;
8 wherein the steps of the evaluating the accuracy and
9 determining the length are executed at the transmitting
10 side.

1 Claim 13 (original): The method according to claim
2 12,

3 wherein, in the step of evaluating the accuracy, the
4 accuracy of the matching is evaluated based on a distance
5 from a node to a closest point on an adjacent road and the
6 difference between the intercept azimuths at the node and
7 at the closest point.

1 Claim 14 (original): A position information
2 transmission apparatus for transmitting road shape
3 information to specify the target road section on a digital
4 map, the apparatus comprising:

5 position information converting means for selecting
6 the target road section;

7 transmit node extracting means for intermittently
8 selecting nodes in the road shape information out of the
9 nodes arranged on the target road section; and

10 transmitting means for transmitting the selected nodes
11 of the target road section.

1 Claim 15 (original): A position information receiving
2 apparatus for receiving road shape information designating
3 a target road section on a digital map and for specifying
4 the target road section based on the road shape
5 information, the apparatus comprising:

6 map matching means for performing map matching to
7 determine positions of selected nodes included in the road
8 shape information; and

9 route search means for obtaining the road connecting
10 the nodes determined to reproduce the target road section.

1 Claim 16 (original): The position information
2 receiving apparatus according to claim 15,

3 wherein the map matching means executes a map matching
4 based on node information of some of the nodes included in
5 the road shape information to determine the positions of
6 the nodes on a digital map.

1 Claim 17 (currently amended): The position

2 information receiving apparatus according to claim 15,

3 wherein the map matching means executes a map matching
4 based on node information of at least two nodes in the road
5 shape information to determine the positions of the nodes
6 on a digital map.

1 Claim 18 (previously presented): A method for

2 identifying position of a target road section on a digital
3 map, said method comprising the steps of:
4 at a transmitting side having a first digital map,
5 creating position information of the target road
6 section on a first digital map, wherein said position
7 information includes coordinate information of nodes
8 selected from the target road section;
9 sending said position information of the target road
10 section;
11 at a receiving side having a second digital map,
12 receiving said position information of the target road
13 section;
14 calculating a path connecting said selected nodes on
15 the second digital map based on said coordinate
16 information; and
17 identifying position of said target road section on
18 the second digital map based on the calculated path.

1 Claim 19 (previously presented) : The method according
2 to Claim 18,
3 wherein, in the step of calculating the path between
4 the selected nodes, said receiving side calculates the
5 shortest path between said selected nodes.

1 Claim 20 (previously presented) : The method according
2 to Claim 18,

3 wherein said nodes are intermittently selected from
4 the target road.

1 Claim 21 (currently amended): A method for
2 identifying position of a target road section on a digital
3 map, said method comprising the steps of:

4 at a transmitting side having a first digital map,
5 creating position information of the target road
6 section on the first digital map, wherein said position
7 information includes nodes intermittently selected ~~form~~from
8 said target road section and representing said target road
9 section, coordinate information of the selected nodes, and
10 supplementary information;

11 sending said position information of said target road
12 section;

13 at a receiving side having a second digital map,
14 receiving said position information of said target
15 road section;

16 calculating a path connecting the selected nodes on a
17 second digital map with referring to at least the
18 supplementary information; and

19 identifying position of said target road section on
20 the second digital map based on said calculated path.

1 Claim 22 (previously presented): The method according
2 to any one of claims 18 to 21,

3 wherein said position information includes a node on
4 a intersection.

1 Claim 23 (previously presented) : The method according
2 to any one of the claims 18 to 21,

3 wherein said position information includes a node on
4 any points between intersections.

1 Claim 24 (previously presented) : The method according
2 to any one of claims 18 to 20,

3 wherein said position information includes a node in
4 the middle of distance between intersections or in the
5 vicinity of the middle of distance between intersections.

1 Claim 25 (previously presented) : The method according
2 to Claim 21,

3 wherein said supplementary information indicates
4 attribute of the selected nodes.

1 Claim 26 (previously presented) : The method according
2 to Claim 21,

3 wherein said supplementary information indicates
4 attribute of a path between said selected nodes.

1 Claim 27 (previously presented) : The method according
2 to Claim 25,

3 wherein said attribute of nodes indicates any one of
4 a road type, an intercept azimuth, a crossing link angle,
5 and a road name, at each nodes.

1 Claim 28 (previously presented): The method according
2 to Claim 26,

3 wherein said attribute of path indicates any one of a
4 length and a road type, of the path.

1 Claim 29 (currently amended): A method for
2 identifying position of a target road section on a digital
3 map, said method comprising the steps of:

4 at a transmitting side having a first digital map,
5 creating position information of the target road
6 section, wherein said position information includes
7 coordinate information of nodes selected ~~form~~from the
8 target road section and at least a part of said nodes
9 represent a shape of a predetermined section of the target
10 road section;

11 sending said position information of the target road
12 section;

13 at a receiving side having a second digital map,
14 identifying position of said predetermined section on
15 the second digital map by using said shape;

16 calculating a path of the other section on the second
17 digital map; and

18 identifying position of the target road section on the
19 second digital map based on the identified position of said
20 predetermined section and the calculated path.

1 Claim 30 (previously presented): The method according
2 to claim 29,

3 wherein said nodes representing said predetermined
4 section are selected more thickly than the other section.

1 Claim 31 (previously presented): The method according
2 to claim 29,

3 wherein said predetermined section is a section which
4 is estimated to cause an error matching at the sending
5 side, or a section which is estimated to cause a
6 miscalculation of a path thereof at the sending side.

1 Claim 32 (currently amended): The method according to
2 claim 29,

3 wherein said predetermined section ~~fails~~falls into one
4 of a section to which plural roads run parallel and a
5 section having a possibility that plural paths are
6 calculated.

1 Claim 33 (previously presented): An apparatus for
2 providing position information indicating a target road
3 section on a digital map, said apparatus comprising:

4 means for identifying a target road section on a
5 digital map;

6 means for intermittently selecting nodes from points
7 arranged on the target road section;

8 means for obtaining coordinate information of the
9 selected nodes;

10 means for creating position information from the
11 obtained coordinate information; and

12 means for transmitting the position information.

1 Claim 34 (previously presented): An apparatus for
2 providing position information indicating a target road
3 section on a digital map, said apparatus comprising:

4 means for identifying a target road section on a
5 digital map;

6 means for selecting a predetermined section from the
7 target road section;

8 means for intermittently selecting nodes from points
9 arranged on the target road section in such manner that
10 nodes are selected more thickly in the predetermined
11 section than the other section of the target road section;

12 means for obtaining coordinate information of the
13 selected nodes;

14 means for creating position information from the
15 obtained coordinate information; and

16 means for transmitting the position information.

1 Claim 35 (currently amended): An apparatus for
2 identifying position of a road section ~~represented by~~ on a
3 digital map at a receiving side based on position
4 information on a digital map at a transmitting side, said
5 apparatus comprising:

6 means for determining position of nodes representing
7 the target road section on the digital map at the receiving
8 side based on the position information on the digital map
9 at the transmitting side;

10 means for calculating a path connecting the nodes;

11 means for identifying position of the road section on
12 a digital map at a receiving side; and

13 means for reproducing the road section on a digital
14 map at a receiving side.

1 Claim 36 (currently amended): [[The]]An apparatus
2 according to claim 35, for identifying position of a road
3 section represented by position information, said apparatus
4 comprising:

5 means for determining position of nodes representing
6 the target road section based on the position information;

7 means for calculating a path connecting the nodes;

8 means for identifying position of the road section;
9 and

10 means for reproducing the road section;

11 wherein said position identification means identifies
12 the position of the target road section based on the
13 coordinate information of at least one of the nodes
14 included in the position information.

1 Claim 37 (currently amended): [[The]]An apparatus
2 ~~according to claim 35, for identifying position of a road~~
3 ~~section represented by position information, said apparatus~~
4 ~~comprising:~~

5 means for determining position of nodes representing
6 the target road section based on the position information;
7 means for calculating a path connecting the nodes;
8 means for identifying position of the road section;
9 and
10 means for reproducing the road section
11 wherein said position identification means identifies
12 the position of the target road section based on the
13 coordinate information of at least two of the nodes
14 included in the position information.

1 Claim 38 (currently amended): A program product for
2 creating and transmitting position information, said
3 program product comprising a computer usable medium
4 including therein a computer readable program code, said
5 computer readable program code comprising:
6 program code means for creating position information

7 of a target road section on a first digital map, wherein
8 said position information includes nodes intermittently
9 selected ~~form~~from points of the target road section and
10 representing the target road section; and

11 program code means for transmitting said position
12 information to a receiving side having a second digital
13 map.

1 Claim 39 (currently amended): A program product for
2 receiving position information and identifying a position
3 of a target road section represented by the position
4 information, said program product comprising a computer
5 usable medium including therein a computer readable program
6 code, said computer readable program code comprising:

7 program code means for receiving the position
8 information including coordinate information of nodes
9 selected ~~form~~from points arranged on the object on a first
10 digital map;

11 program code means for calculating a path connecting
12 the nodes;

13 program code means for identifying position of the
14 object on a second digital map based on the coordinate
15 information and the calculated path.

1 Claim 40 (previously presented): A method for
2 identifying a first road section on a first digital map,

3 and identifying a second road section, corresponding to the
4 first road section, on a second digital map, the method
5 comprising the steps of:

6 selecting the first road section on the first digital
7 map;

8 selecting first plural points located on the first
9 road section, on the first digital map;

10 creating location information indicative of
11 coordinates of the first plural points on the first digital
12 map;

13 identifying plural second points, corresponding to the
14 first plural points, on the second map with reference to
15 the location information;

16 calculating a path connecting the second plural points
17 on the second map; and

18 identifying the second road section on the second map
19 based on the path.

1 Claim 41 (previously presented): A method for
2 identifying a first road section on a first digital map,
3 and identifying a second road section, corresponding to the
4 first road section, on a second map, the method comprising
5 the steps of:

6 selecting the first road section on the first digital
7 map;

8 extracting a part of the first road section as a

9 predetermined section on the first digital map;

10 selecting first plural points located on the first

11 predetermined section on the first digital map;

12 creating location information indicative of

13 coordinates of the first plural points on the first digital

14 map;

15 creating positional information indicative of a

16 relative positional relationship between the first road

17 section and the first predetermined section on the first

18 digital map;

19 identifying plural second points, corresponding to the

20 first plural points, on the second map with reference to

21 the location information;

22 identifying a second predetermined section,

23 corresponding to the first predetermined section, on the

24 second digital map based on the plural second points; and

25 identifying the second road section on the second map

26 based on the second predetermined section and the

27 positional information.

1 Claim 42 (previously presented) : The method according

2 to claim 40 or 41,

3 wherein the coordinate information indicates an

4 absolute coordinate of one of the first plural points as

5 the coordinate of the one of the first plural points, and

6 a relative positional relationship between the one of the

7 first plural points and another one of the first plural
8 points as the coordinate of the other one of the first
9 plural points.

1 Claim 43 (currently amended) : The method according to
2 claim 40 or ~~42~~ 41,

3 wherein the first plural points include a start node
4 and an end node of the first road section on the first
5 digital map.

1 Claim 44 (currently amended) : A method for
2 identifying a road section on a digital map on a receiving
3 side with reference to location information on a digital
4 map at a transmitting side, the method comprising the steps
5 of:

6 identifying plural points on the digital map at the
7 receiving side with reference to the location information
8 on the digital map at the transmitting side;

9 calculating a path connecting the plural points on the
10 digital map at the receiving side; and

11 identifying the road section on the digital map at the
12 receiving side based on the path.